



## Plant Tomato Seeds

### Preface

In 2018 I raised and extracted my own tomato seeds. It was the very old variety [Bernier Rose](#) that was not difficult. This year (2019) I want to cross two varieties with each other to breed a new variety. The second variety is the open source seeds variety [Sunviva](#), which I ordered online. When planting I will use the method of combination symbiosis and later process the extracted seeds in selection breeding. In theory, I hope that this will give me the best results. After this year, my goal is to apply for a [legally sustainable license](#) from the Open Source Seeds initiative, so that it can be marketed and distributed at a later date. My second goal is to grow a stable variety that can be [grown on the ISS](#) or on long missions (e.g. [to Mars](#)). My dream is to get a chance to grow the finished variety in [EDEN](#). However, a lot of development technology and experiments are still necessary before I can turn to official institutions.

### Materials

For breeding we need two varieties of tomato seeds, which we can cross with each other. And also growing soil. Water in a spray bottle. Small cardboard boxes, so that you don't have so much work later to separate the tomato plants. I have an extra small mini garden house for my windowsill, because I live in the city and can only grow there, I have to improvise a little in the experimental setup.

### Realisation

Those who want to grow their tomatoes in the apartment should do so in a slightly heated room with a bright window. Avoid north windows. The seeds are placed in a bowl or a pot. The right time to sow the tomatoes in a location on the windowsill is between mid-February and mid-March. You can start sowing in the middle of February in bright places by the window. If the location on the windowsill is rather dark, it is better to wait until mid-March.

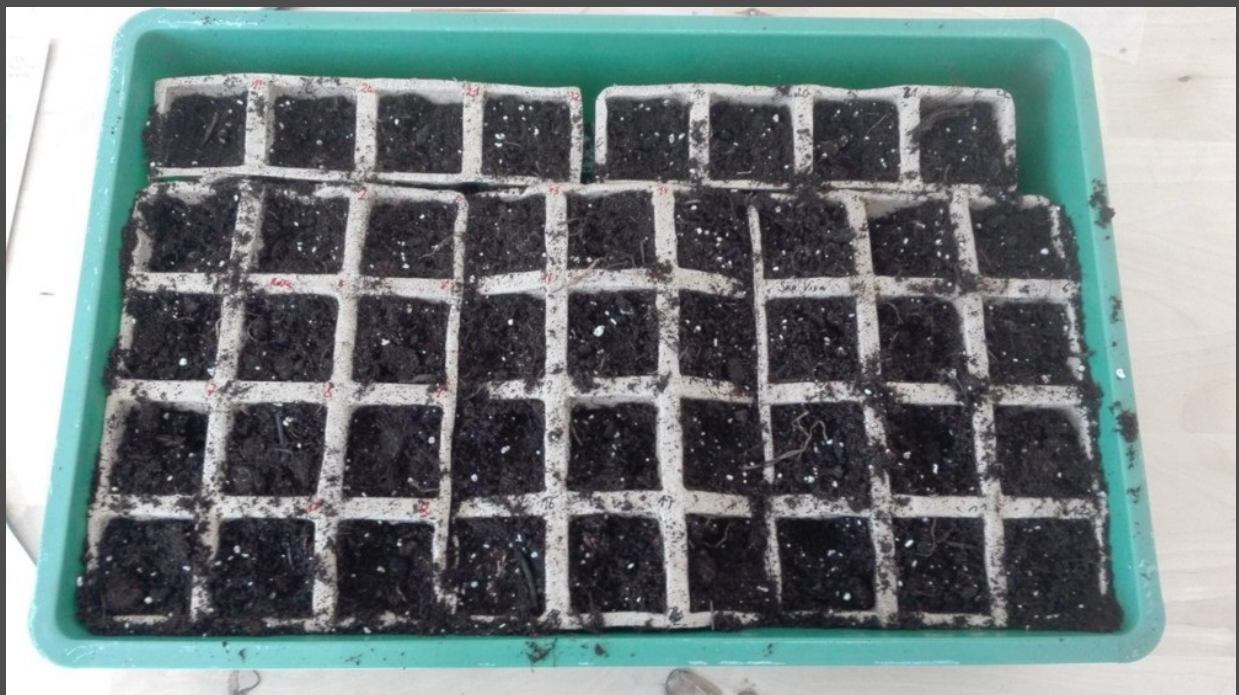


Tomato plants are light buckets. If they are sown too deep, they do not germinate. The tomato plant thrives best if it is sown half a centimetre deep. In a bright environment and with regular watering, the germination period is usually 3 to 10 days. They can be isolated after 3 to 4 weeks. For a further 3 to 4 weeks they grow into strong young plants, which can be outdoors strengthened and hardened. The development of the young tomato plants takes about 2 months.





In addition, open the cover briefly every day so that the air can be exchanged. At a germination temperature of 18 to 25 degrees Celsius, it takes about ten days to see the first cotyledons. As soon as the first real tomato leaves have formed, the young plants must be pricked. Use a special pricking stick or simply the handle of a cutlery spoon. Carefully lift the root system and then place the tomato plant in a nine-centimetre pot (flower pot with a diameter of nine centimetres) with normal potting soil. If you have sown the tomatoes in multi-pot plates, simply convert them together with their root balls into larger pots.



The tomato plants are first cultivated on the windowsill or in the greenhouse until they reach a height of about 30 centimetres. Make sure that the ambient temperatures are not too high after the emergence - 18 to 20 degrees are ideal. If the temperature is too high, for example over a radiator on the windowsill, the young tomatoes drift very strongly, but get too little light. After the Ice Saints (mid-May) you can place the young plants in the garden bed. However, tomato plants are healthier and yield more if you keep them in the greenhouse or protect them from rain with a tomato house.





After a few days the small plants should be placed in a larger box. Be as careful as possible not to damage them. I also made a small sign and wrote on it which variety it is. The eggshell is there to bring a little lime into the earth. My grandmother has always done that, but I can't say if it will do anything yet. Unfortunately only two plants have grown so far and don't know why, because I actually did everything by the book.



Sometimes it can happen that two or three seeds sprout at the same time and in the same place. Since I don't want to separate the plants later, I do this now and see which shoot grows best. That's what you do when you want to grow tomatoes. Since my variety should only have strong tomatoes, I have to help a little in some places.





Transplanting the Berne Rose

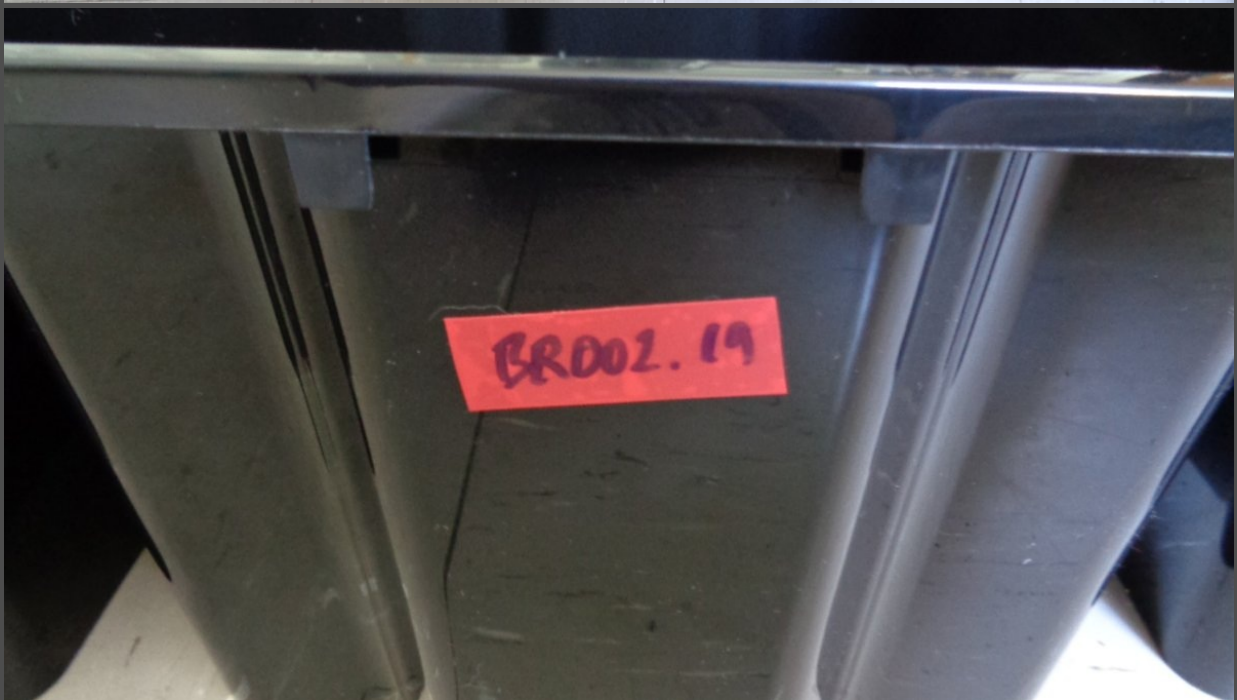


As the Bernese Rose tomato variety grows faster, it can be planted in larger containers after 6-10 days. I bought 12 barrels from a Swedish furniture manufacturer. Six for each variety. With this I can be sure to get some orderly plants and don't have to panic if one or two plants don't grow. The capacity of a single baehelter is about 10l. Thus a single plant has enough space to spread out. I bought a total of 80l of light soil in the supermarket and divided it into six containers.



Since I work with scientific methods in this experiment, I inscribe every construction container. I use the designations **BR** (Bernese Rose), **001** (number) and **.19** (year). This results in the total designation **BR001.19-BR006.19**. This helps me to control the different plants and to document special developments etc.. Later, the Bernese rose and the Sunviva must also be distinguished, because at the latest when the two varieties are crossed with each other, I have to document there very precisely. This in turn helps other people to understand my project exactly and to point out the source of possible mistakes. It is important to document everything in a project, even things that seem unimportant at first. For the inscription I used simple red tape and a blue waterproof pen.









After the soil has been filled into the individual containers, the small seedlings can be taken out of the old box and planted. You have to work very carefully, because you shouldn't tear off roots or single leaves. It helps if you only do this with your hands and do without garden tools. This gives you better control over the work process. Sharp shovels quickly cut the small roots. After you have moved all the plants, you give them a little bit of water. This helps against a [repot shock](#) and gives the tomatoes a better starting condition. After a few days of rest, you can finally put them on the balcony where they can get more sunshine and thrive better.







### Fertilizing the Tomatoes

Normally I don't think much of fertilizing plants or flowers, because this impairs the naturalness of life. I am inspired by Masanobu Fukuoka and his film *Natural farmin* [>video](#). Since this is not my own garden, but a scientific breeding, I decided to use a very small amount of fertilizer for several days in the first phase after repotting. I used vegetable fertilizer, which you can buy on the internet, in the supermarket or at the florist. Please note that fertilizer is toxic and should not be drunk under any circumstances.



The packaging indicates the different quantities that can be used. I have chosen the smallest amount because I want to use as little fertilizer as possible. This means: Dosage I, March-October: 1-2 times per week on 1 litre of water. I will only make a mixture and then use it up. Until then, the tomatoes should be large and strong enough to withstand extreme weather conditions and bear the fruit needed for breeding.





By the way, I also measured how much water fits into my spray bottle, because it was not specified by the manufacturer. It is about 450 ml. With the measuring cup I measured the quantity I need (1 liter). I pour the water into an old plastic water bottle (this bottle must not be used afterwards!).







If you have purchased another brand of fertilizer, you must follow the instructions on the packaging for measuring. I have three small marks at different heights. One (I) is the smallest height, so we pour the fertilizer to the top edge of the lowest mark. We make sure that the room is ventilated and that we don't spill anything.





We carefully pour the fertilizer into the water bottle containing 1 litre of water. We label them with warnings so that no one will ever get the idea to drink from them. Such bottles are never placed in



the refrigerator, but in a cupboard, which can be locked with a small lock. Then it cannot be touched by children, guests or pets.



So that we can measure exactly how much fertilizer/water mixture we use, I take a small syringe (without needle) with a filling quantity of 2ml. You can order it on the internet or buy it from a pharmacist. For each plant I will then use the quantity just mentioned.







We pour a little of the mixture into a disposable cup. This cup can also no longer be used afterwards. Don't use the cups or glasses you want to drink from later.







We apply 2ml fertiliser/water mixture with the sprayer and give it to one plant at a time. Repeat this until we have fertilized all the plants. Then we stow everything in a safe place.







The amount I use is a very small amount. I don't want to over-fertilise the plants and endanger the project. Since I am not a biologist, I have to work carefully on the subject. I hope that this is enough to give the tomatoes a small start.

## Week 2

After 14 days I can finally publish the first results. I noticed the following things. The Berner Rose grows much faster than the Sunviva. My guess is that the Berner Rose already comes from a professional breeding in which the breeding goal was the fast growth of a plant. Another assumption I had is that seeds with a small brown spot on the surface have a genetic defect and therefore do not grow well. This assumption seems to be confirmed because I had sown a test seed **BR-001.19** and the plant does not seem to grow well. I would have to extend this test in the next generation to confirm my theory. Otherwise they all seem to grow normally (even if they don't get enough sun, which can be due to the unusually changeable weather). Below the table with the size of the individual plants. The measurements were taken between soil/root and first green.

## Move to the balcony and two withered plants.

It's a shame to see plants that have dried up overnight. Unfortunately this happens every now and then. I also can't explain why this happened, because I treated all plants the same. Each plant got the same amount of water, fertilizer and sunlight. Unfortunately the tomato plants with the numbers **SV002.19** and **SV003.19** didn't make it. Of all things, there were also two of the Sunviva variety. But that's exactly what I want to sort out, because I don't want to grow weak plants, which would go bad at the first signs of more extreme weather conditions. Yes, tomatoes are actually not suitable for having to endure such harsh conditions, because the other growers have adapted tomatoes to human needs for centuries. You always had technology that gave you advantages. I also want to use technology, but my plants should still be able to endure more by themselves.





This leaves a total of ten plants. Six perennials of the Berner Rose and four perennials of the Sunviva. These have all grown quite well and have grown again in the last few days. So they are ready to be spread out on the balcony. The weather is just unstable and changes quickly from cold (14°) to heat (35°). In between there are always strong storms, rain and sultry weather with high humidity. I'm not a meteorologist, but it doesn't seem normal. But that we humans have a huge influence on the whole [world climate](#), [the seas](#) and [nature](#) should be clear to everyone even if he is not a scientist.





#### Week 4

Two weeks ago I measured the tomato plants for the last time. A lot has happened since then. E.g. we had almost always warm weather and not so cold nights. So the tomatoes could grow well which I also show in the following data. The genetic damage on one plant [SV-006.19](#) (picture) seems to be confirmed, because I have never seen such a crooked growth before. I don't think I'll use the seeds for the [F1 hybrid generation](#) and we'd rather put them in a salad. D = Dead.



#### Week 6





After six weeks the plants have grown massively. Even small plants have grown, new shoots have developed and many leaves have been planted. The Sunviva have partly overtaken the Bernese rose, although they were bigger in the beginning. Some tomato plants already get their first buds and will (hopefully) be able to present finished flowers in the next two weeks. The weather is a bit too unstable and I thought about building a technical device to measure the humidity of the soil.

#### Week 8









In the eighth week, most of the plants have once again grown considerably in size. All plants got flowers and about half of them have already been fertilized or bear fruit. Most of the fruits grow very fast and become 1 cm bigger almost every day. Otherwise there are no special occurrences, except the fear that both varieties did not mix with each other.

### Data

Berner Rose	Week 2	Week 4	Week 6	Week 8
BR-001.19	3,8 cm	8,0 cm	44,0 cm	67,0 cm
BR-002.19	9,7 cm	20,5 cm	59,0 cm	73,0 cm
BR-003.19	7,0 cm	18,5 cm	52,0 cm	68,8 cm
BR-004.19	7,5 cm	18,0 cm	64,0 cm	119,0 cm
BR-005.19	9,5 cm	19,3 cm	67,0 cm	88,5 cm
BR-006.19	10,0 cm	24,0 cm	63,0 cm	87,0 cm
Sunviva	Week 2	Week 4	Week 6	Week 8
SV-001.19	4,0 cm	15,8 cm	69,0 cm	96,0 cm
SV-002.19	3,3 cm	D	D	D
SV-003.19	2,2 cm	D	D	D



SV-004.19	3,0 cm	16,0 cm	64,5 cm	112,0 cm
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SV-005.19	2,5 cm	14,8 cm	54,0 cm	75,0 cm
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SV-006.19	1,0 cm	10,5 cm	49,8 cm	105,0 cm
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